

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	121	(knowledge adj2 management) and (training adj2 program)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2004/12/15 10:04
L2	0	(knowledge adj2 management) and (training adj2 program) and @pd<"20001206"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2004/12/15 09:37
L3	1	((capture or organize or manage) adj2 (corporate or company or organization) adj2 (knowledge or information)) and (training adj program)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2004/12/15 10:06
L4	546	((capture or organize or manage) and (corporate or company or organization) and (knowledge or information)) and (training adj program)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2004/12/15 10:15
L5	49	(capture or organize or manage) and ((corporate or company or organization) adj (knowledge or information)) and (training adj program)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2004/12/15 10:16

13/9/3 (Item 2 from file: 621)

DIALOG(R) File 621:Gale Group New Prod.Annou.(R)

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**Portera Announces New Partnership With LearningAction; Portera's Professional Services Automation Solution, ServicePort, Enhanced With More Leading Training Content.**

Business Wire, p0292

August 15, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 526

TEXT:

Business Editors, High-Tech Writers

CAMPBELL, Calif.--(BUSINESS WIRE)--Aug. 15, 2000

Portera, a leading vertical service provider delivering innovative outsourcing solutions to the professional services industry, today announced a partnership with LearningAction, a leading provider of Web-based corporate compliance and compliance training solutions.

LearningAction joins other industry leaders like DigitalThink (Nasdaq:DTHK) as content partners for Portera's ServicePort, the first-of-its-kind Web-hosted professional services automation (PSA) solution with integrated learning management.

"Especially in the professional services industry, where people are the primary asset, employee development is essential," said Elise Olding, vice president of knowledge, e-learning and collaboration at Hurwitz Group, a software industry analyst and consulting firm. "Portera has recognized this and developed a robust learning solution that is nicely integrated into their PSA solution. The integration of learning management in ServicePort enables service organizations to be more strategic in their employee development, by matching training to pipeline opportunities and creating employee-specific learning tracks."

Through this partnership, Portera is able to provide its ServicePort subscribers with industry-leading online compliance training to supplement their internally developed courses. LearningAction helps Portera customers effectively communicate corporate policies through a combination of online legal and compliance training courses.

"Our partnership with Portera expands our ability to serve the unique needs of the rapidly growing professional services industry," said LearningAction president Josh Abramowitz. "Portera's 100 percent Web-hosted approach and integration with PSA are setting the standard for online training in the professional service industry. We are proud to make our online legal and compliance training available through Portera ServicePort."

Gary Steele, CEO of Portera, said, "Developing and retaining talent is a crucial part of running a professional service **business**. That's why we've been offering **learning management** solutions to our customers for some time. Portera was the first in the industry to provide a PSA solution with integrated learning management and we continue to enhance this unique Web-hosted service."

Portera's Learning Manager, which was released in February, is a comprehensive Web-hosted employee development and training solution designed specifically for professional services organizations. It simplifies the scheduling, enrollment, payment and tracking of employee training and, through integration with ServicePort, enables professional service organizations to match training **needs** to business opportunities and **measure** the return on training investment.

About LearningAction

LearningAction, Inc, is the first company devoted to providing Web-based training on corporate legal topics. LearningAction systems enable a company to train workers on harassment, discrimination, wrongful termination, and other legal matters. With LearningAction, a company can reach its entire workforce, and can document that workers have participated in the training. LearningAction systems are also highly cost-effective, and are customizable to suit the needs of different organizations. Learning Action is a privately held company based in Boston, Massachusetts.

About Portera

Portera is a leading vertical service provider delivering innovative outsourcing solutions to the professional services industry. Professional service organizations worldwide leverage Portera's technology-based services to enhance productivity and margins. Leading organizations that have chosen to focus on their core business of serving clients by using Portera's solutions include: Agilent, British Telecom, Commerce One, E.piphany, Hewlett-Packard, Inventa, Microsoft, Network Associates, Tanning Technology and Viant.

Further information about Portera can be found at [www.portera.com](http://www.portera.com).

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**click2learn.com Unveils Ingenium 5.0 Learning Management System; Major upgrade manages e-Learning and instructor-led training in single platform.**

Business Wire, p0169

Feb 9, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 970

TEXT:

Business Editors, High-Tech Writers

BELLEVUE, Wash.--(BUSINESS WIRE)--Feb. 9, 2000

click2learn.com, inc. (Nasdaq:CLKS), a Wired World Company(TM), today announced the immediate availability of Ingenium 5.0, a major upgrade to its leading enterprise learning management system.

The new release of the skills and competency based system enables organizations to manage every type of training, from instructor-led through technology-based, using one enterprise-wide solution. Ingenium's Web Connect module allows users to access Ingenium's many features through a browser, such as the new training gap analysis, and improved skills and competency gap analysis. Ingenium also tracks results for e-Learning content from many vendors, including titles from SmartForce (Nasdaq:SMTF), SkillSoft (Nasdaq:SKIL), NETg (NYSE:H), content created in click2learn.com's ToolBook authoring suite, and Macromedia's (Nasdaq:MACR) Authorware, in addition to AICC-compliant courseware. This offers learners and administrators a seamless, integrated environment for offering and managing the optimal mix of e-Learning content, as well as managing instructor-led classes.

“Leading companies make major investments in improving the skills and competencies of their employees and need a solution to manage every form of learning -- no matter what the delivery vehicle is,” said Kevin Oakes, president and CEO of click2learn.com, inc. “Our Ingenium Learning Management System has been the long-time leader in skills management, and now fully integrates e-Learning for simplified, comprehensive access by learners, managers, and training administrators.”

Ingenium 5.0 extends its skills and competency management strength by introducing graphical “learning maps,” as well as a new training gap analysis feature. Learning maps enable trainers and administrators to assemble learning experiences into a graphical display to guide the learner through a series of courses. These maps can be developed for jobs, illustrating the specific skills needed to advance to a new position, or for organizations, providing the particular certifications or knowledge needed as employees move into a new area. The maps can also be prescribed for a specific student based on his/her career development needs. The new training gap analysis is a related feature that compares a student's completed training with the learning requirements for any combination of job and organization. Ingenium's introduction of the learning map concept is an important innovation that helps align the development of individual

learners with organizational objectives.

"Ingenium has always provided learning management based on strong skills and competency management," observes Brandon Hall, Ph.D., editor brandon-hall.com, "and the newest version demonstrates their understanding of the importance of managing every form of learning from one system. Enterprise learning management systems continue to be a mission-critical decision for organizations and those pursuing such a system should consider this strong new offering from click2learn.com."

Buckman Laboratories, a \$310 million privately held specialty chemical company, is well-known for its commitment to knowledge management innovation and ongoing growth of its employee associates world-wide. They have used Ingenium since 1997 and helped shape the expanded features of version 5.0. "We needed to simultaneously deliver the same high quality product training to all of our associates, any where in the world, whether in Indonesia or here locally in Memphis," says Sheldon Ellis, Vice President of the Bulab Learning Center. "Because Ingenium is skills-based, supervisors can sit down with their staff one-on-one and map out a career path based on the specific skills that will make each associate successful. This career mapping approach motivates the individual to take responsibility for their own career development." Ingenium's ability to offer learners a catalog of every type of training, and to maintain a complete record of training outcomes, is critical to Buckman's strategy. "We find that e-Learning is a great way to get learners to a common knowledge level, making time in the classroom more effective," adds Ellis.

Substantial enhancements were made to each of Ingenium's components. These enhancements include:

- Ingenium Web Connect, which allows learners and managers complete access to relevant features through a web browser
- Ingenium Messenger Express, which uses push technology to automate notification of learners concerning registration, certification reminders, and event cancellations
- Ingenium Report Browser, which now includes over 80 professionally designed Seagate Software Crystal Reports, allowing users to export information in many common formats including HTML
- The newly released Data Update and Import Tool, which simplifies integration with existing enterprise applications such as HRIS and ERP systems

Ingenium 5.0 is available in an Enterprise edition appropriate for multi-site organizations of any size. Smaller organizations can implement the lower cost Workgroup edition. Ingenium 5.0 is available immediately from click2learn.com's direct sales organization.

About click2learn.com, inc.

click2learn.com, inc. (Nasdaq:CLKS) formerly known as Asymetrix Learning Systems, Inc. (Nasdaq:ASYM) is a leading provider of e-Learning solutions to businesses, government, and educational institutions throughout the world. By developing a powerful and full-featured ASP platform for e-Learning, and partnering with market-leading content publishers, click2learn.com is able to provide customers with instant access to their e-Learning Network. Customers can access thousands of courses, and use browser-based publishing and learning management tools using a custom-configured e-Learning site or by visiting the e-Learning Portal at [www.click2learn.com](http://www.click2learn.com). click2learn.com's enterprise e-Learning initiatives include learning management products (spearheaded by the market leading Ingenium total learning management solution) and web-based authoring software products (featuring the acclaimed ToolBook II Instructor and Assistant authoring tools). Each solution is augmented by professional services including award winning custom content development, strategic consulting and integration services. For more information on click2learn.com's e-Learning solutions, call 800/448-6543 or 425/462-0501. click2learn.com, inc. is located on the World Wide Web at [www.click2learn.com](http://www.click2learn.com).

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# Training for Employment— A Systematic Approach

by Clifton P. Campbell  
University of Tennessee, USA



## Introduction

Today, more than ever, training programmes are being held accountable for providing the "work-ready" graduates that employers want. Yet, after years of research and debate, there is still no consensus on the best course of action for achieving programme accountability. However, many see cause for optimism in an Instructional Systems Methodology for planning, developing, implementing and evaluating training programmes. This competency (performance)-based systems approach ensures that trainees are taught the knowledge and skills essential for successful job performance.

Accountability, the driving force behind competency-based training, is substantially increased when the principles and processes of this carefully conceived instructional system are used. This is because the derivative and iterative character of the methodology ensures, when its procedures are resolutely carried out, that instruction will be job relevant.

The procedural model for this instructional system comprises five phases: (1) analyse; (2) design; (3) develop; (4)

implement, and (5) control. Figure 1 provides a graphic portrayal of the interrelationships between the five phases and 17 procedural steps which form the closed-loop system. The model is based on both research and years of practical experience in its application.

Certain components, such as job analysis and learning objectives, have been used by trainers and educators for some time. Nevertheless, the application was often haphazard and fragmentary. This model brings these and other components together in a coherent whole. The critical distinction with this procedural model is the emphasis on an integrated instructional system.

Each of the following five headings is devoted to presenting descriptive information on a phase of the model. The model and text can be used in much the same way as a cookbook recipe—do this, then that and you have a cake.

## The Main Phases

### Analyse

The first procedural step in the model is to analyse the job under consideration to determine the human performance activities. Job analysis is the foundation for sound training programmes and the basis for determining the job-relevant behaviours that trainees must be capable of performing when they complete their instruction.

Unless personally familiar with the job, a document study should be conducted at the outset. This is done to find out as much as possible about the job and any job analysis work which is available. Once the literature has been reviewed, one or more of the job analysis techniques is selected for use. The technique selected will depend on its relative utility and whether the purpose is to identify and describe the tasks and elements of tasks that make up the job or to verify existing job analysis information.

The more common techniques are:

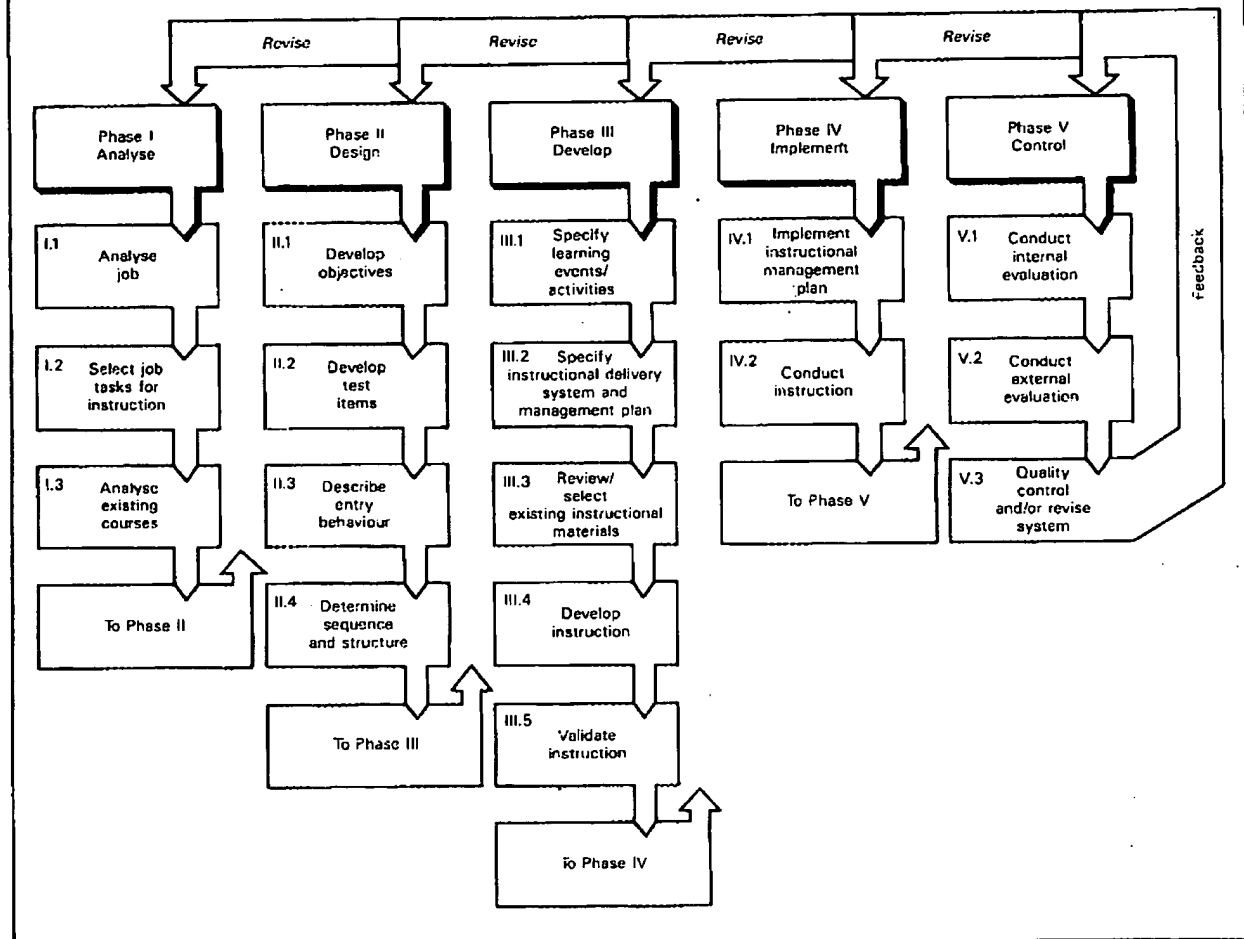
- (a) Observations of expert worker performance;
- (b) Group or individual interviews with expert workers and their supervisors;
- (c) Questionnaire surveys of expert workers and their supervisors, and
- (d) A jury of expert workers and supervisors.

While the observation and interview techniques are the most dependable for gathering detailed job information, no one method of job analysis is the best for all situations. In fact, the use of a combination of data-gathering techniques, such as observation and interviews, is preferable. When several of the techniques offer reasonable alternatives, the advantages and limitations of each should be considered in the light of constraints such as time and the availability of professional help (see Table I).

No matter how well the remaining procedural steps are carried out, if the job analysis information collected from this pivotal step is not valid and reliable, the training programme will fail to produce graduates who can perform successfully on the job.

Some of the tasks identified can be performed without training or seldom will be required on the job. Only minimum job degradation would result if such tasks were performed

Figure 1. Instructional Systems Model



inadequately by a job-entry worker. Other tasks may be highly critical to successful job performance, and their complex nature or frequency of performance makes instruction essential. The needs of the job, economics, time, facilities and other considerations require a "best judgment" decision when determining which tasks to include in the training programme[1]. Rejected tasks are not reconsidered until the external evaluation step which is performed after a training cycle is completed and graduates are on the job.

In order to avoid unnecessary duplication of effort, existing course documentation and other available material should be reviewed. This endeavour may reveal that all or portions of the instructional system have already been done by someone else and are suitable for use. It would not be cost-effective, however, to use materials from another source which have not been validated or are essentially extraneous.

### Design

The development of objectives is the beginning step in designing training to meet job-performance requirements. From this point, instructional design and development is carried out with respect to learning objectives rather than job tasks. Some of the benefits of properly stated objectives are:

- A clear-cut description of the knowledge and skills that are to be attained by the trainee;
- A sound basis for writing test items, and
- Determination of the most suitable instructional strategy.

Learning objectives provide the behavioural actions, performance conditions and attainment standards which can be measured within the instructional setting (see Table II for guidelines in writing the three parts of a learning objective).

Terminal learning objectives are those formulated for the tasks that were selected for instruction. Each terminal learning objective is subjected to a hierarchical analysis to derive subordinate or enabling objectives. These enabling objectives provide the level of detail necessary to specify the behavioural elements, and the skills and knowledge that help the trainee achieve a terminal objective[2]. In many cases, the resultant enabling objectives will specify the same behavioural actions as the elements of the job-task itself.

Learning objectives bridge the gap between task performance under normal work conditions and learning how to perform that task in an instructional setting. They serve as a control over the content and output of instruction. The

**Table I. Advantages and Limitations of Selected Job-analysis Techniques**

Technique	Advantages	Limitations
Observation of expert workers doing the job at the work site	Finds out what incumbents actually do, not what they say they do Accomplished directly by observer or indirectly with cameras Few people involved	Can only observe a sample of all the job tasks Expensive and time-consuming Direct observation can bias worker performance Requires a trained observer
In-person interviews with expert workers and their supervisors	High response rate from selected incumbents Yields high-quality information	Expensive and time-consuming to conduct interviews and compile data Results depend on the co-operation of those interviewed Interferes with operational activities Requires a trained interviewer with a pleasant personality
Telephone interviews with expert workers and their supervisors	High response rate from selected incumbents Inexpensive Information collected in a short time	Less sensitive than in-person interviews Requires a trained interviewer with a good telephone manner
Questionnaire sent to expert workers and their supervisors	Can survey a large random sample of incumbents economically by mail Yields large amounts of information Responses are adaptable to machine tabulation and statistical analysis	Requires know-how to prepare a questionnaire with explicit instructions Places a heavy demand on recall by those completing it Low response rate (especially if filled out in a person's own time) May be incomplete or filled out by an unqualified person
Jury of experts	Inexpensive and reliable Information collected and verified in a short time Few people involved	Requires time away from the job Requires trained interviewer and recorder

ability to develop objectives (teach and test those objectives) is the foundation for trainee achievement.

After the learning objectives have been prepared, test items to measure their attainment are written. These test items, called criterion-referenced measures, test the required behavioural actions under the conditions and standards specified in the objectives.\* For contrast, a norm-referenced

\* Test items are written for learning objectives rather than from the subject matter as is the practice in some other instructional approaches.

**Table II. Writing the Three Parts of a Learning Objective**

Behavioural actions (what trainee does)	Performance conditions (what trainee is given)	Attainment standards (how well it is done)
Use action verbs that are: Observable Measurable Verifiable Reliable (not prone to varying interpretation) Appropriate to task performance	Inputs include: Tools and equipment References Job performance aids Special instructions Environment Problem situations or contingencies	Criteria include: Accuracy requirements Qualitative requirements Time requirements Rate of production Amount of supervision
Examples of action verbs: operate, adjust, repair, remove, replace, multiply, label, record, file, measure, identify, compute, name, write, list and type		Example of a standard: type—without error at a minimum speed of 40 words per minute
Sample objective: Multiply 10 decimal numbers, 2 to 4 digits long, by a 1-digit number and record the results of each calculation	Using a hand-held calculator, given a sheet of problems and a pencil	With 100% accuracy, within 3 minutes

test is one in which a trainee's performance is compared with the average (norm) performance on the test.

The nature of the learning objective determines the type of criterion-test item needed, e.g. paper and pencil items are used to assess knowledge and performance items are used to evaluate motor skills. Performance items are preferred, since they relate directly to job-task performance. Sufficient test items should be written for each learning objective so that alternative forms, not just scrambled versions, of a test can be prepared. Alternative forms of a test are used by trainees who do not meet acceptable performance levels on their first test, are remedied and then retested.

After the test items are written, those that were designed for lower-level enabling objectives should be administered to a representative sample of the trainee population to measure entry-level behaviour which includes the knowledge and skills specific to the training programmes that incoming trainees already possess.

Estimates of trainee capabilities must be verified or adjusted according to test results so that instruction meets trainees at the point of their need. When the test shows that some of the enabling objectives have already been acquired, they and their corresponding test items should be deleted from the training programme. Whenever the test indicates that trainees lack prerequisite knowledge and skills, additional learning objectives and test items must be developed to fill the gap between previously made entry-level assumptions

and the true entry-level behaviour of trainees. Entry-level behaviour can also be determined by testing training programme participants just prior to the beginning of instruction. Unfortunately, this approach leaves little time to make any modifications.

The next step is to determine and specify how the terminal objectives and their respective enabling objectives will be sequenced and structured to provide for optimum learning. These decisions are made, as much as possible, on the basis of learning factors. However, given the inadequacy of knowledge about how different sequencing strategies affect learning and the difficulty of estimating transfer of learning, they are based, in part, on judgment.

### Provide active participation and purposeful practice

Objectives are first categorised as dependent, independent or supportive (those between which some transfer of learning occurs). The dependent objectives are then sequenced in accordance with the existing hierarchy of skills and knowledge so that prerequisite learning occurs first. Next, supporting objectives are placed as close to each other as possible without interfering with the dependent sequencing. Independent objectives are sequenced last in accordance with such principles as simple to complex, familiar to unfamiliar, the order performed on the job, or any other order that is practical. Identical learning objectives are deleted and those with identical actions are grouped together so that each is taught only once.

To the extent that seems reasonable, the sequenced learning objectives are grouped (structured) into units, blocks of instruction or other organised and manageable sets of objectives in the way that they will be presented to trainees. Grouping is an arbitrary matter based on rational judgments regarding: (a) commonality of subject matter, (b) anticipated transfer of learning, (c) meaningful relationships, and (d) a natural beginning and ending point.

Because test items measure specific learning objectives, they are structured at the same time as the learning objectives. This facilitates the grouping of test items into pre-tests, progress tests and post-tests.

### Develop

The sequenced and structured learning objectives, from the previous phase--design--identify what is to be taught. Once this is known, learning guidelines are considered in planning and developing the activities that will produce the desired learning outcomes. Learning guidelines are statements which specify teaching/learning principles, events and activities. Three basic guidelines (conditions) for learning are:

- (1) Provide guidance and prompts. Trainees should be shown and told how to do something. They need examples of what to do and explanations of how

to do it. Performance ought to be as error-free as possible, since an error once made is likely to recur. Visual and verbal cues should be provided before and during practice to prevent guesswork and ensure correct performance[3].

- (2) Provide feedback. Trainees need to know how they are doing. Such feedback should be prompt and indicate what is right or wrong and how to correct errors and improve performance. Knowledge and performance tests, as well as written work, should be used as teaching tools by fairly assessing the accomplishment of learning objectives and by providing reinforcement for success and explanations for mistakes[4].
- (3) Provide active participation and purposeful practice. Practising skills and reviewing knowledge is critical to learning and the retention of what is learned. While excessive practice becomes dull and is uneconomical, some degree of overlearning is desirable in order to enhance retention. Trainees learn by applying, in a meaningful way, what they are taught. Learning proceeds most effectively and tends to be most permanent when it is personally meaningful. Learning is an individual process in which trainees gain knowledge and skills and shape attitudes through their own activities, experiences and motivation.

These guidelines serve as an aid in establishing appropriate learning activities specific to each objective. The learning activities then help identify what the instructor and/or the instructional materials must do to help the trainee attain the learning objective.

Since there are numerous methods and various media to choose from, the instructional delivery system normally includes a combination of appropriate teaching methods, the optional instructional media and a system of organising trainees and instructors to accomplish all learning objectives. Methods and media are selected on the basis of careful analysis of the instructional situation from several standpoints: (a) learning objective, (b) learning activities, (c) learning stage, (d) characteristics of the trainee population, (e) instructional staff, (f) equipment and facility constraints, (g) time and cost advantages, (h) whether group-paced or self-paced instruction is used, and (i) the extent to which instruction is individualised. An instructional management plan consists of the policies and procedures used in organising, controlling and evaluating the delivery of instruction. This plan indicates:

- (a) How the training programme is to be conducted;
- (b) How the trainees are to be managed;
- (c) When and where they will be tested;
- (d) What the instructors and other support personnel are to do, and
- (e) How each of the many elements within the plan work together.

Documents that are a part of the management plan specify the procedures to be used in scheduling, orienting incoming trainees, instructing, monitoring and evaluating both the trainees and instructors, and whatever else is needed to operate the training programme.

Developing instructional materials is a time-consuming and expensive activity. It is essential, therefore, to search out and



consider the suitability of existing "off-the-shelf" items before committing resources to the development of new materials[5]. Candidate materials should be reviewed to determine their appropriateness to previously specified objectives, learning guidelines and activities, methods and media. Materials developed elsewhere that are nearly, but not entirely, adequate may be adapted for use.

At this point the available existing instructional materials have been selected for use—some with minor revisions and some possibly with none. All that remains is to utilise the preceding analysis and planning to produce the necessary additional material\*.

The actual authoring process consists of writing or developing many different types of instructional materials: (a) scripts, (b) sound/slide and videotape presentations, (c) programmed texts, (d) instructional packages (modules), and (e) job performance aids. Initially, these materials should include only the bare minimum of instruction, which will be augmented as needed for trainees to attain the learning objectives. This "lean" strategy prevents the inclusion of non-essential information and instruction.

All instructional materials should be reviewed by a knowledgeable individual as they become available. Then they are tried out on the more capable trainees with revisions and enrichment made as necessary. This assures the economies of minimal instruction and the correction of errors and deficiencies. Quantitative information about the effectiveness of instruction is obtained through validation procedures which provide further opportunities for revision.

Validation procedures include both individual and group trials by selected members of the trainee population or representative learners. First, instructional materials are individually tried out on two to five trainees, revised and tried again until areas of difficulty are corrected. Then group trials are conducted until it is proven that the trainees can attain the learning objectives as measured by criterion-referenced tests[6].

After validation, instructional materials are ready for quantity reproduction and implementation. When they are put into use before validation trials are completed, continual revision, based on class experience, should be anticipated.

## Implement

The implementation of the instructional management plan developed previously is the terminal step in planning and preparation and occurs before trainees arrive. Prior to the beginning of instruction, any needed refinements in the materials, procedures, tests and other components of the total training programmes are made.

It is also necessary to make sure that the instructors and other personnel are trained in the techniques and procedures with which they are not familiar. The emphasis is on assuring that enough qualified people are (a) at the right place at the right time, (b) that they know what they are

\*It is explicit in this approach that learning objectives are prepared for every job-task selected for instruction and that these learning objectives are the basis for the selection and development of all instructional materials used in the training programme. Objectives are not derived from existing subject matter as is the practice in some other approaches.

to do, and (c) they have the materials, equipment, facilities and other resources necessary to do it.

Complete training programme capability, consisting of learning objectives, criterion-referenced tests, instructional materials, instructional management plan, a trained staff, and adequate facilities, equipment, tools and supplies should be available at this point. What remains to be done is to conduct instruction in accordance with the procedures and documentation contained in the instructional management plan. This is the "fruit of the labour".

... necessary to make sure that  
instructors... are trained in the  
techniques and procedures

In addition to managing the resources, conducting instruction, evaluating trainees and other activities, instructors need to keep records and collect data which is useful in evaluating the training programme. Among the records kept are: (a) test results and trainee performance for each learning objective, (b) enrolment, (c) attendance, (d) attrition, and (e) scheduling data.

A daily log is also maintained in which information such as the following is noted:

- (1) Instructor comments on trainees;
- (2) Time requirements for instruction and testing;
- (3) Problems with instructional materials;
- (4) Problems with people associated with instruction, and
- (5) Positive and negative incidents.

All editorial, procedural and content changes that were made must also be documented in order to facilitate a complete and accurate programme evaluation.

At the completion of each training cycle, the collected information is made available as part of the internal evaluation in order to improve instruction for succeeding cycles.

## Control

Despite the care taken in each procedural step while developing the training programme, it is still necessary to determine the effectiveness of the programme operating as a dynamic interrelated entity. The internal and external evaluation steps in this phase provide the information needed to determine if the training programme accomplished what it was designed and developed to do.

Internal evaluation is based on information obtained within the training activity and is sometimes called a course review. It seeks to determine if instruction is providing trainees with the knowledge and skills necessary to attain the learning objectives. The principal measure of instructional effectiveness is the trainees' performance on criterion-referenced progress and post-tests. Other measures include:

- (a) Instructor evaluations;
- (b) Trainee and instructor opinions concerning instruction and testing, and
- (c) The amount of time required to complete each learning objective (time on task).

Training records and reports, as well as the notes kept by instructors during the conduct of instruction, provide additional sources of valuable information on programme operation and management. This is augmented by a check on the instructional materials, training facilities, equipment, tools and supplies to make sure they are adequate and appropriate.

...most reliable...feedback is gained at the work site by observing the graduates' job performance...

An examination of how the programme development effort was carried out is also part of the internal evaluation. The purpose is to identify any procedural omissions. Since the capabilities and performance of trainees and the manner in which instruction is conducted may change over time, internal evaluation is an ongoing process.

The external evaluation is conducted to determine whether graduates are performing successfully on the job. It uses job performance as the standard to evaluate proficiency and the adequacy of the training programme. In a sense, this evaluation revalidates the job analysis and selection of tasks for instruction.

External feedback is obtained by questionnaire, field interview or observation. The most reliable, but costly, feedback is gained at the work site by observing the graduates' job performance and by interviewing both graduates and their supervisors. Questionnaires completed by graduates and their immediate supervisors provide a valuable and less expensive means for conducting field-based evaluation.

The external evaluation should take place when the graduate has been on the job for one to three months. This timing is important because the graduate needs to get oriented and acquire a feel for what the job is all about. Further, the graduate and supervisor need time to formulate judgments concerning job preparation and performance. If more than three months lapse before the graduate and supervisor are contacted, it becomes difficult to discriminate between knowledge and skills acquired in training and those acquired on the job. As with internal evaluation, external evaluation is a recurring process which identifies problems and makes specific recommendations for appropriate adjustments.

The final function is that of maintaining quality control of the instructional programme. This is done through revisions that keep training viable, relevant and up to date. Revisions include changes in objectives, learning activities, reallocations of time and similar actions. They are made to improve trainee performance, reduce the time required to complete

instruction, or obtain the appropriate level of effectiveness at a lower cost.

Since a considerable amount of effort has gone into the design and development of an instructional programme, revisions are approached with care. Decisions about what to revise should be based on the findings of internal and external evaluations[7].

The evaluation and quality control steps complete the feedback and interaction process, thereby forming the closed-loop instructional system shown in Figure 1. Continual evaluation and quality control are necessary to ensure that instruction is efficiently and effectively conducted to meet job requirements.

## Concluding Comments

Training programmes based on nothing more than an instructor's notion of what should be taught and how the training should be organised and delivered are in trouble. Such programmes will have to change in fundamental ways if they are to play a role in technological development and economic growth.

The search for an approach with increased likelihood for providing training adequate to meet job-performance requirements has resulted in the advancement of an instructional systems methodology. The iterative and derivative character of this methodology assures that instruction will meet job requirements when its procedures are conscientiously carried out.

There is nothing really novel about these procedures. They are broadly accepted and have been used for a number of years. Nor is instructional systems a catchword to suggest something new; at most it is a process for doing something better in deliberately attempting to be systematic, analytic and comprehensive.

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